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(54) Patient table in combination with a magnetic resonance imaging machine

(57) A patient table (2), particularly in combination with a magnetic resonance imaging machine, comprising a supporting surface, having such a size as to be able to accommodate at least a part of the patient body and providing at least one recess (302), in one or more areas or at one or more peripheral edges of this supporting surface.

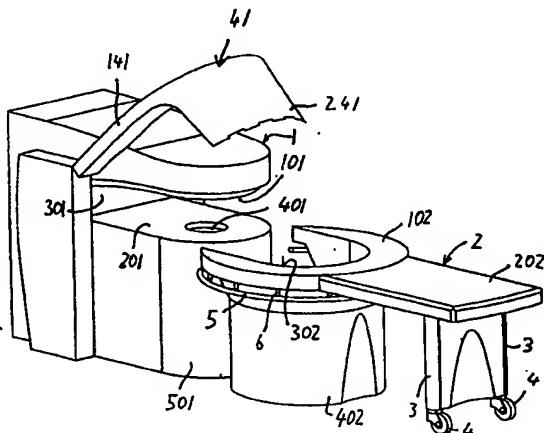


Fig. 1

Description

[0001] The invention relates to a patient table, or similar, particularly in combination with biomedical apparatus like magnetic resonance imaging machine comprising a supporting surface which has such a size as to be able to accommodate at least a part of the patient body.

[0002] At present, patient tables, especially those for bearing the patient during diagnostic and therapeutic treatment, by using machines for diagnosis and therapy, are deemed to be separate from the structure of these machines. In order to allow limbs or anatomic regions of the patient body to be inserted into the operating area of the machine, such as an operating surface, a chamber or a cavity two solutions are essentially applied.

[0003] When machines allow to do so, the table, having a substantially conventional shape is fully or partially inserted into the structure thereof. This solution involves a huge size of machines, which have a very high purchase and installation cost. Large machines are generally cumbersome and heavy and cannot be placed in premises having a normal construction as regards volume and resistance of floors. This involves cost increases, which are added to the higher cost of the machine.

[0004] In Nuclear Magnetic Resonance Imaging machines, the weight problem is important, and the dimensional problem also affects installation costs when, for instance, machines must be enclosed by shielding cages which, by their huge volume, usually have no light construction.

[0005] An alternative solution, generally used with low and medium size and low and medium cost machines, particularly in Nuclear Magnetic Resonance, consists in simply placing tables next to the operating surfaces, chambers or cavities of machines. This can be also done by providing coupling constraints between the two structures, in order to obtain certain relative positions, although the machines and the table are always separate and distinct units, as regards both construction and structural synergy. The overall dimensions of the machine with the addition of the table increases considerably and, substantially, to an extent corresponding to the dimensions of the table. When, e.g. in Nuclear Magnetic Resonance machines, a limb or anatomic region of the patient is to be positioned inside a cavity or onto an operating surface, the patient has to be moved, or convertible arm-chairs must be provided, which have tilting parts or the like, or the dimensions of the supporting surfaces of tables have to be limited to a part of the patient body, i.e. to the part which is intended to stay outside the cavities, chambers or operating surfaces.

[0006] Anyway, the above solutions do not involve a synergic relationship between the table and the machine, or the chambers, cavities or operating or work or intervention surfaces thereof.

[0007] Further problems also arise when the patient

5 is to be disposed in different orientations within a predetermined range. Here, conventional tables, particularly when combined with low or medium cost machines, involve a considerably larger potential overall size of the table-machine combination.

[0008] The invention has the object to provide a patient table which, by using comparatively simple and inexpensive means can be more comfortable and user-friendly, particularly with diagnosis and/or therapy machines.

[0009] The invention achieves the above purposes by providing a table as described herein, comprising at least one recess, in one or more areas of the patient supporting surface, these recesses being open at one or more peripheral edges of this supporting surface.

[0010] According to a further characteristic, each recess is associated to a removable insert for complementing the supporting surface. These parts may be coupled in different manners and by using different means.

[0011] One embodiment provides that said recesses have a much smaller size than the overall supporting surface of the table and that they form open spaces in said supporting plane, such that they can be covered by the patient body without affecting the support thereof.

[0012] In a preferred embodiment, a table has, for instance, a plurality of these recesses, which can be provided in the area of the upper limbs and shoulder, in the area of the neck and head, and in the area of the lower limbs, such as the knee, the foot or similar, i.e. in the end areas of the table.

[0013] According to the size of recesses, there may be also provided more of them, for instance in the trunk area.

[0014] The means for coupling the complementary inserts are preferably of the sliding type and are provided partly on said inserts, and partly at the delimiting edges of recesses.

[0015] Said means may be also provided on the general operating surface of a machine for diagnostic testing and for therapeutic applications.

[0016] According to a further characteristic, in order to provide adaptability to several different sizes of operating or work surfaces, inserts may be modular and modules may also have different shapes, so as to allow them to fit the different possible shapes of the operating surfaces.

[0017] A further characteristic of the invention advantageously provides a table which is transversely divided into two parts, preferably but not necessarily substantially in the median area, which parts complement each other in jointed coupling.

[0018] A preferred construction provides that a part of the table is provided, at its periphery, with a preferably circular guide, completely surrounding it, and extending from one end to the other of the end side of said part of the table, said end side being opposite to the end con-

nected to the other part of the table.

[0019] A particularly advantageous configuration of this table provides that a part of the table has a recess whose median axis is oriented coaxially to the central longitudinal axis of the table, which recess has its open side at the end side of the part of the table wherein it is provided, which is opposite to the side connected to the other part of the table.

[0020] Here, the part of the table with the recess at its end side substantially consists of a U-shaped frame, whereas the guide for jointing it to the other part of the table is attached all around said U-shaped frame.

[0021] The U-shaped frame may also have a circular outside perimeter, coaxial to the arched jointing guide.

[0022] Particularly, in order that a certain relative orientation can be maintained between the two parts of the table, there are provided removable means for locking the two parts of the table in the different angular mutual orientation positions.

[0023] The two parts of the table may have two legs each, disposed so that the table can be self-supporting, whereas each part cannot be self-supporting in the work position, without the other.

[0024] Alternatively, each part may have such a number of legs as to enable a self-support thereof, when separated from the other part. All legs may be wheeled.

[0025] Legs may be arranged in such a manner and number that the table may be used as a conventional transport table.

[0026] Thanks to the above characteristics, the table in accordance with the invention may be integrated in or complemented by any work or operating surface or any side or wall for delimiting operating chambers or cavities of diagnosis or therapy machines.

[0027] The mutual penetration of the work or operating surface and the table allows a considerable reduction of the overall size. Modular solutions of removable complementary inserts allow a table to fit several different operating or work surfaces. The latter are not only work surfaces or operating zones of the machines, but may be also surfaces equipped for performing manual interventions. Hence, one table can fit several different operating conditions, so that the patient need not be frequently transferred for the different interventions.

[0028] The embodiment providing a table divided into two separate parts, which may be oriented in any angular position on the horizontal plane allows to simply orient the patient with respect to the operating or work surface, to the operating chamber or cavity, which complement the recess of one of the two parts of the table.

[0029] The recessed part of the table advantageously has sliding means for coupling to the side of the machine which is designed to complement the recess/es, for instance by means of sliding guides, preferably along a rectilinear sliding path, directed towards the open side of the recess.

[0030] Shock-absorbing or yielding end-of-stroke means are also provided.

[0031] The table advantageously consists of a part having the form of a frame whose inner edge has a U-shaped profile, opening on the end side towards the side of the machine which delimits or defines the chamber or the cavity or the surface for bearing the patient, or parts of his/her body inside the machine, whereas a second part of the table is coupled to the first part, so as to allow free orientation on the horizontal plane.

[0032] This arrangement is particularly advantageous with machines having access apertures for the patient body on at least three sides of their perimeter.

[0033] Particularly, the table provides considerable advantages, when used in combination with Nuclear Magnetic Resonance Imaging machines. In such machines, this configuration equals that of a machine having a C-shaped magnet, i.e. whose cavity may be accessed from three sides of its perimeter. Here, the lower horizontal side of the cavity is the side or surface which is to complement the U-shaped recess of the table.

[0034] With such a construction of the magnet, the two parts of the table can have an angular range for mutual orientation of about 180°.

[0035] However, if the magnet is composed of two horizontal plates, separated by two or three columns, the angular positions for mutual orientation can extend over 360°, excepting the positions in which the outer part is in line with the columns or uprights. Advantageously, in order to allow the table to be simply coupled to the magnet, i.e. to the side which delimits the cavity, the arched guide for the second part of the table has an angular extension of less than 360°, since it is interrupted at the end aperture of the recess. The orientation angular width between the two parts of the table can be determined in this case by coupling the table on the diametrically opposite part of the magnet structure.

[0036] The invention addresses further improvements, which form the subject of the dependent claims.

[0037] The characteristics of the invention and the advantages derived therefrom will appear more clearly from the following description of certain exemplary embodiments, illustrated without limitation by the accompanying drawings, in which:

50 Fig. 1 is a perspective view of a first embodiment of the invention, in which the machine comprises a C-shaped magnet with horizontal poles and a table consisting of two parts, which are jointed or may be oriented on the horizontal plane, the table being uncoupled from the magnet.

55 Fig. 2 is a perspective view like that of fig. 1, in which the table is coupled to the magnet and the part of the table outside the magnet is angularly displaced, with its longitudinal axis being oriented perpendicular to the longitudinal axis of the part of the table coupled to the magnet and with a rigid shield-

ing member in the lifted position.

Fig. 3 is a view like that of fig. 2, in which the shielding member is lowered to the position in which it closes the open front side.

Figs. 4 and 5 are lateral elevational, partially sectional views of the machine as shown in the previous figures, with the table being uncoupled from and coupled to the magnet respectively.

Figs. 6 and 7 are a top plan view and a lateral view respectively, both partially sectional, of the table as shown in the previous figures.

Figs. 8 and 9 are top plan views of the machine as shown in the previous figures, with the table having the outer part perpendicular to the part coupled to the magnet and being coupled to and uncoupled from the magnet respectively.

Fig. 10 shows a detail of the sliding means for coupling the table and the magnet as shown in the previous figures.

Fig. 11 is a top plan view of a detail of the means for locking the two parts of the table in the different mutual orientation positions.

Fig. 12 is a front view of the detail as shown in fig. 11.

Figs. 13 and 14 are lateral views of the details as shown in figs. 11 and 12 with the locking members being in the engaged and released positions.

Figs. 15 and 16 show a second embodiment of the invention.

[0038] The embodiments illustrated herein particularly relate to a combination of a table according to the invention and a Nuclear Magnetic Resonance Imaging machine. This combination shall not be deemed to be limited to the scope of the invention. In fact, instead of the lower horizontal side 201 of the magnet cavity, which side 201 complements the recess 301 of the table, the part for complementing the recess 302 of the table may consist of work or operating surfaces, or sides for delimiting operating chambers of any type and/or of any machine for diagnosis and/or therapy.

[0039] Since in Nuclear Magnetic Resonance machines, the problems to reduce costs and dimensions are very important, and still directly connected to each other, the combination illustrated and described herein consists of a table and of a Nuclear Magnetic Resonance Imaging machine, and particularly includes a low or medium cost and a low or medium sized machine.

[0040] Referring to figs. 1 to 9, a Nuclear Magnetic Resonance Imaging machine comprises a magnet part 1. The magnet shown in these figures is U-shaped and defines a cavity with three open sides of its perimeter, while being delimited by an upper side 101, a lower side 201 and a vertical side 301. These three sides are the cover of the magnetic structure and of other operating members, which is made of an appropriate material, e.g. of plastic or the like, and has a recess 401, in a pre-

determined area, for accommodating the fastening base of a receiving coil.

[0041] The free end edges of the upper and lower sides 101 and 201 are rounded, preferably with a semi-circular profile.

[0042] A table 2 is associated to the magnet 1. The table consists of two parts 102, 202. The part 102 has a supporting surface having a hollow 302 having a shape complementary and a size corresponding to the lower side 201 of the magnet 1, while it can have any outer shape, preferably a circular segment shape with an angular extension of more than 180°, such as to fully surround the central U-shaped hollow. The part 102 of the table is designed to be fitted around the side 201 of the magnet 1, which complements the supporting surface. The part 102 of the table is supported by at least a pair of wheeled 4 legs 3, which are provided at least in the end side for connection to the other part 202 of the table, also supported by a pair of wheeled 4 legs 3, being provided on the end side opposite to the one connecting to the part 102. The supporting surface of the two parts of the table is at the same level as the side 201 of the magnet 1. The part 202 of the table, named outer part in the disclosure and claims, rests, at the end connecting to the part 102, on a guide 5 which is supported so as to project downwardly, towards the connecting end of the part 202 of the table, by vertical pins 6 and by radial pins 7, arranged radially inside the guide 5. The guide 5 advantageously consists of a cylindrical section which is arched according to the outer cylindrical profile of the part 102 of the table. The part 102 of the table has a covering case 402, for covering the supporting legs and other members, which, in the magnet-coupling condition, superposes the case 501 of the magnet, providing the machine with a particularly pleasant continuous aspect.

[0043] Thanks to this construction, the table 2 may be coupled to the magnet 1, thus forming a complete supporting surface for the patient, having such a size as to be able to comfortably bear the patient body, while reducing the overall dimensions, i.e. the part of the table projecting out of the magnet. Further, the so-called outer part 202 of the table can rotate about the part 102, which is coupled to and complemented by the lower side 201 of the magnet 1, in such a manner that it can have any orientation on the horizontal plane with respect to the part 102. Here, the U-shaped structure of the magnet provides an angular orientation range of about 180°, hence allowing to dispose the patient along an axis parallel to the vertical side 301, along an axis perpendicular thereto, or along axes with intermediate directions on both sides of the axis perpendicular to the vertical side 301.

[0044] In combination with machines having magnets with different conformations, the rotation of the part 202 with respect to the part 102 can be either reduced, for instance by using magnets with two open sides perpendicular to each other, or extended, for instance by

using magnets in which the cavity is only defined by two sides, e.g. the upper horizontal side and the lower horizontal side, whereas the poles associated to said two sides are spaced by uprights or columns, whose number and size can vary from at least 1 to 2, 3 or more.

[0045] In order to use this table, for example to transport the patient, the part 102 may have a pair of wheeled legs also at the ends of the branches of the U-shape. Also, a removable member may be provided for closing the hollow, thereby completing the supporting surface, for example by sliding engagement means.

[0046] With particular reference to figs. 4, 5, 8, 9 and 10, the part 102 of the table can be slidably coupled to the magnet 1. This may be done by using guide means, one part thereof being associated to the sides of the magnet 1, superposed by the branches of the supporting surface with the U-shaped hollow.

[0047] This arrangement may be obtained in any way. In the illustrated embodiment, a preferably cylindrical guide bar 10, engaged in a sliding guide consisting of vertically opposite rolls, spaced according to the thickness of the guide bar 10, is associated to each branch of the U-shaped hollow 302 of the part 102 of the table.

[0048] Particularly, the guide bar is engaged between a pair of lower rolls 11 and an upper roll 12. All the rolls have an annular peripheral throat having a semicircular or substantially semicircular profile, so that the guide bar can be also held, to a certain extent, in a horizontal transverse direction. The upper roll 12 is preferably supported in such a manner as to yield against a predetermined elastic compressive force directed towards the opposite pair of rolls 11.

[0049] This arrangement is obtained by providing an oscillating arm 112, pivoted at its center to oscillate about an axis parallel to that of the roll 12, whereas said roll is mounted on an end of the arm, the other end being connected to a spring, which is fastened to the bearing structure of the machine.

[0050] Moreover, the guide bar may have radial recesses, such as annular throats 111 or radial annular projections, which, in combination with the elastically supported roll 12, define predetermined positions, easily changeable by acting with a certain force in the push or pull direction. In combination therewith, the guide bars 10 and/or other parts of the machine 1 and/or of the part 102 of the table may have sprung and/or shock-absorbing end-of-stroke abutments.

[0051] As is apparent from figures 6 to 9 and 11 to 14, the part 202 is engaged on the arched guide 5 by a cart 15, disposed at the end side of the part 202, which faces the part 102. The cart 15 has a pair of upper wheels 16 and a pair of lower wheels 17, which are supported with their axes being oriented radially with respect to the arched guide and which, like the rolls 11 and 12 have peripheral throats, whose transverse profile is substantially semicircular or the like. The arched guide 5 also preferably has, without limitation, a circular

section. The arched 5 guide is supported in such a manner as to project downwards and radially out of the supporting plane of the part 102 of the table by vertical pins 6, arranged along the extension of the guide 5, whose lower ends are connected to the arched guide by radial fingers 7. The vertical pins 6 may be arranged in any order along the arched guide 5, for instance equally spaced or in such an arrangement as to provide reference points for predetermined orientations of the so-called outer part 202 of the table to the part 102, which is coupled to the side 201 of the magnet 1. In an intermediate position between the wheels 16 and 17, a member 18 for hooking the vertical pins 6, i.e. the pins which lock the part 202 of the table in a predetermined angular position, is provided. The hook-like member 18 consists of a plate having a central U-shaped hollow 118, which is designed to engage the locking vertical pins 6 therein. The hook-like plate is carried by a lever or fork 19, which is supported in such a manner as to be able to oscillate about a horizontal axis 20 transverse to the longitudinal axis of the part 202 of the table. Two elastic members 21, e.g. two helical springs inserted on the corresponding ends of the axis 20 and connected by one of their ends to said axis 20 and by the other end to a stationary abutment of the structure of the table 202, stably stress the lever or fork 19 in such a manner that the latter draws the hook-like plate 18 into a horizontal position, in which it extends into radial engagement of the vertical locking pins 6. A tie rod 23, connected to the lever or fork 19 is also connected to a lever for manual disengagement 24 at the free end of the part 202 of the table. By operating said lever 24, the supporting lever or fork 19 is moved backwards, causing the hook-like plate 18 to oscillate into radially retracted disengagement of the vertical locking pins 6.

[0052] According to an improvement, in order to allow the hook-like plate 18 to be easily automatically hooked to a vertical locking pin, a cam 25 is fastened to the plate. This cam consists of a vertically downwardly projecting plate. The plate-like cam 25 has, along its lower edge, a W profile, in which the outer branches 125 are less inclined than the inner branches 225. The plate-like cam 25 extends vertically downwards so as to cooperate by its profile, with the radial fingers 7, which act as stationary abutments for controlling it. The outer inclined branches 125 form guiding surfaces which, when the cart is moved along the guide, cooperate with one corresponding radial finger 7. As is apparent from figures 13 and 14, the cam 25 causes the hook-like plate to progressively lift into disengagement from the vertical pins, allowing it to pass over the relevant vertical locking pin. When the radial finger 7 passes the lower apex and penetrates between the two inner inclined branches 225 of the plate-like cam 25, the hook-like plate lowers again into engagement of the relevant vertical locking pin 6, which is in the correct position to be engaged in the hollow 118. The W shape of the plate-like cam allows to make use of said automatic snap

engagement functions with the locking pins 6 for movements in either direction.

[0053] Figs. 15 and 16 show a second embodiment of the invention. In this exemplary embodiment, the magnet 1 has a comparatively small size as regards the surfaces of the sides 201 and 101, and especially the depth of the lower side 201 of the magnet 1 is smaller than the overall width of a table 2 of an approximately conventional size.

[0054] The dimension towards the closed or substantially closed vertical wall 301 is also a submultiple of the length and/or width of the table 2. In this example, the side 201 has an arched or semicircular or U shape. The table 2 has, in the area substantially corresponding to the shoulder and to the upper limbs and in the area corresponding to the leg and to the lower limbs, a recess 302, which can be normally closed by a removable, complementarily shaped member 502. This removable complementary member 502 may be, for example, inserted in and removed from its position by using simple sliding guides (not shown in detail), which can consist of a peripheral throat formed in the wall of the recess 302 or of the completion member 502 and of a rib formed in the peripheral wall of the other part.

[0055] As shown in the figures, the recesses 302 have such a size that they do not affect the comfortable support of the patient on the table 2, since they can be bridged by the patient body with no effort and ensuring the support thereof.

[0056] When the width of the table allows to do so, a recess 302 may be also provided at the end side of the table 2, for head and neck testing. However, the configuration as shown in the figures also allows head and neck testing by appropriately positioning the patient on the table without affecting its support and comfort.

[0057] The magnet is small and may be mounted on a cart structure 40. The table, shown in the figures as stationary, may be also provided with supports in the form of a cart.

[0058] According to fig. 14, there might be provided a set of inserts 502' which progressively reduce the dimension of the recess 302 in order to adapt these dimensions to different sizes of working surfaces 201.

[0059] These inserts 502' can be coupled to each other and to the recess of the table like modular elements, and modules might have different shapes, so as to allow them to fit the different possible shapes of the operating surfaces 201. The coupling elements might be mechanical, such as pins and correspondent insert holes in the facing surface of adjacent inserts modules 502'. Alternatively or in combination the coupling means might be for example straps of the kind of the so called VELCRO™. Further known coupling means that might appear obvious to the expert of the art may be used alternatively or in combination with the above cited ones. This feature is only shown in combination with the table of fig. 14 but it might as well applied to the table according to the previous embodiment of the invention

according figures 1 to 13.

[0060] Obviously, the invention is not intended to be limited to the above description and illustrations, but may be greatly varied, especially as regards construction, without departure from the guiding principle disclosed above and claimed below.

Claims

- 5 1. A patient table, or similar, comprising a supporting surface, having such a size as to be able to accommodate at least a part of the patient body, characterized in that it has at least one recess (302), in one or more areas of the supporting surface, these recesses being open at one or more peripheral edges of said supporting surface.
- 10 2. A table as claimed in claim 1, characterized in that each recess (302) is associated to an insert (502) for complementing the supporting surface, which is removable.
- 15 3. A table as claimed in claim 1 or 2, characterized in that said recesses (302) have a much smaller size than the overall supporting surface of the table (2) and that they form open spaces in said supporting plane, such that they can be covered by the patient body without affecting the support thereof.
- 20 4. A table as claimed in one or more of the preceding claims, characterized in that it has a plurality of these recesses (302), particularly at least two or three recesses (302) arranged in the area of the upper limbs and shoulder, in the area of the neck and head, and in the area of the lower limbs, such as the knee, the foot or similar, i.e. in the end areas of the table.
- 25 5. A table as claimed in one or more of the preceding claims, characterized in that at least one recess is provided in the trunk area.
- 30 6. A table as claimed in one or more of the preceding claims, characterized in that there are provided means for coupling the complementary inserts (502) which are preferably of the sliding type and are provided partly on said inserts (502), and partly at the delimiting edges of recesses (302).
- 35 7. A table as claimed in claim 6, characterized in that it is provided in combination with a general operating surface (201), whereas the sliding coupling means are associated, for a part (10), to the recess (302) of the table (2) and for the other complementary part (11, 12) to the general operating or work surface (201), possibly a work surface, a side of a chamber or a cavity, of a machine for diagnostic testing and for therapeutic applications.
- 40
- 45
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- 55

8. A table as claimed in one or more of the preceding claims, characterized in that, in order to provide adaptability to several different sizes of different operating or work surfaces (201), inserts (502) can be coupled to each other and to the recess of the table like modular elements, and modules have different shapes, so as to allow them to fit the different possible shapes of the operating surfaces (201). 5

9. A table as claimed in one or more of the preceding claims, characterized in that it is transversely divided into two parts (102, 202), preferably in an approximately median area, which parts complement each other in jointed coupling. 10

10. A table as claimed in one or more of the preceding claims, characterized in that a part of the table (102) is provided, at its periphery, on the side connecting to the other part (202) with a preferably circular guide (5), completely surrounding said first part of the table (102), excepting the open side of the recess/es (302), with which guide (5) a sliding cart (15), associated to the second part of the table (202) is engaged. 15

11. A table as claimed in one or more of the preceding claims, characterized in that the part (102) of the table (2), whereto the guide (5) is associated has at least one recess (302) at the end side opposite to the one connecting to the other part (202) of the table (2) and substantially consists of a U-shaped frame, whereas the arched guide (5) for jointing it to the other part (202) of the table (2) is attached all around said U-shaped frame, extending from one end to the other of the end side of said part (102) of the table, said end side being opposite to the end connected to the other part of the table. 20

12. A table as claimed in one or more of the preceding claims, characterized in that the recess (302) has a U shape, whereas the has a circular outside perimeter, coaxial to the arched jointing guide (5). 25

13. A table as claimed in one or more of the preceding claims, characterized in that, in order that a certain relative orientation can be maintained between the two parts (102, 202) of the table (2), there are provided removable means (6, 7, 18, 19) for locking the two parts of the table in the different angular mutual orientation positions. 30

14. A table as claimed in claim 13, characterized in that the position lock means (6, 18) are associated to means (7, 19) for automatic snap operation of said position lock means (6, 18) and to manual releasing means (23, 24). 35

15. A table as claimed in claim 14, characterized in 40

that said arched guide (5) is associated to means (6) for stopping and locking in the mutual predetermined orientation positions the two parts (102, 202) of the table (2), which means interact with removable means (18) for removably hooking the locking members (6). 45

16. A table as claimed in claim 14 or 15, characterized in that the snap hook-like means (18) are provided in combination with a cam (25), which is controlled by abutments (7), associated, in a predetermined position, to the locking members (6), said cam (25) having such a profile (125, 225) that it can draw the hook-like means (18) into non-interference with the locking members (6), when they get close to the locking members (6), drawing said hook-like means (18) into engagement with the stationary locking members (6), when the latter are in the right hooking position, in line with said locking members (6). 50

17. A table as claimed in one or more of claims 14 to 16, characterized in that the cam (25) consists of a W-shaped plate, with rounded vertices and a central hollow, which has relatively steep lateral walls (225), whereas the outer inclined fronts or edges (125) thereof have smoother inclinations and act as control surfaces, wherewith the control abutments (7) interact, said cam (25) being fastened to the hook-like means (18), which are stably stressed towards engagement of the locking members (6) by elastic means (21). 55

18. A table as claimed in one or more of the preceding claims 14 to 17, characterized in that the locking members (6) consist of vertical pins arranged along the extension of the arched guide (5) associated to one part (102) of the table, whereas the stationary abutments (7) for controlling the cam (25) consist of radial fingers and are also arranged along the arched guide (5), and the hook-like means (18) consist of a plate perpendicular to the locking pins (6), and with a central hollow (118), which plate is supported on the facing end side of the part of the table whereto the hook-like means (18) are associated, in such a manner as to be able to oscillate about a horizontal axis, substantially tangential to the arched guide or anyway perpendicular to an axis passing through the center of the arched guide (5) and oriented substantially longitudinally to the table (2), the plate-like cam (25) being fastened to the hook-like means (18) and oriented perpendicular to said hook-like means (18). 60

19. A table as claimed claim 18, characterized in that the hook-like means (18) and the cam (25) are disposed, with respect to the locking pins (6) and to the control abutments (7), in such a manner that the 65

oscillation runs from a lower engagement operated position, in which the central hollow (118), i.e. the associated side edges of the hook-like means (18) come next to the vertical locking pins (6) and an oscillated upward position, in which the central hollow (118), i.e. the side edges thereof terminate at a certain radial distance from the vertical locking pins (6).

20. A table as claimed in one or more of the preceding claims, characterized in that the locking pins (6) and the control fingers (7) of the cam (25) are inside the guide (5) in radial positions, and that the radial fingers (7) connect the arched guide (5) to the free end of the locking pins (6), which project downwards out of the supporting surface of the table (2), thereby acting as means for supporting the arched guide (5) so that the latter can project downwards with respect to the plane of the table (2) and towards the facing part (202) of the table which bears the cart (15) with the cam (25) and the hook-like means (18).

21. A table as claimed in one or more of the preceding claims, characterized in that the two parts of the table (102, 202) have two legs each (3), disposed so that the table (2) can be self-supporting, whereas each part (102, 202) cannot be self-supporting in the work position, without the other.

22. A table as claimed in one or more of the preceding claims, characterized in that each part (102, 202) of the table may have such a number of legs (3) as to enable a self-support thereof, when separated from the other part, whereas the legs (3) may be wheeled (4) or not.

23. A table as claimed in one or more of the preceding claims, characterized in that the structure of the table (2) and the arrangement of the legs (3) is such that the table may be used as a conventional transport table.

24. A table as claimed in one or more of the preceding claims, characterized in that it has a U-shaped recess (302) in combination with a complementarily shaped work surface (201), which is designed to complement the table in the area of said recess, guide bars (10), parallel to the central axis of the recess and/or perpendicular to the open side thereof at the perimeter of the table (2), being provided along the branches of the U-shaped recess, which guide bars (10) interact each with a sliding cart fastened to the bearing structure of the work surface (201) which is designed to complement the table at the recess (302), said carts having at least two opposite rolls (11, 12), spaced complementarily to the guide bars.

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25. A table as claimed in one or more of the preceding claims, characterized in that the guide bar has, at least on the side which adheres against the corresponding roll/s (11, 12), a cross section which is shaped complementarily to the shape of the peripheral side of the rolls (11, 12), the guide bar (10) being preferably cylindrical and the rolls (11, 12) being preferably provided with peripheral annular throats.

26. A table as claimed in one or more of the preceding claims, characterized in that at least the roll/s (12) on one side of the guide bar (10) are elastically stressed against the guide bar (10).

27. A table as claimed in one or more of the preceding claims, characterized in that the guide bar (10) has throats or projections (110) which interact with the roll/a (12) elastically loaded against it, to indicate predetermined positions and to retain said positions against a limited pushing and/or pulling force acting on the table (2).

28. A table as claimed in one or more of the preceding claims, characterized in that the table (2) and the work surface (201) which is designed to fill the recess (302) are provided with sprung end-of-stroke abutments (210, 310).

29. A table as claimed in one or more of the preceding claims, characterized in that the arched guide (5) has a round section, whereas the cart (15) engaged thereon has two rolls (16, 17), preferably a pair of rolls (16, 17), engaging the arched guide (5) on substantially diametrically opposite sides and in peripheral annular throats of said rolls (16, 17), which throats are complementary to the section of the arched guide (5).

30. A machine for diagnostic and/or therapeutic treatment, particularly a Nuclear Magnetic Resonance Imaging machine, comprising, in combination therewith, a table (2) for supporting the patient as claimed in one or more of the preceding claims 1 to 29, which table (2) is or can be integrated in the structure of the machine, and particularly in the magnet structure (1), wherein at least one recess (302) in the surface of the table (2) or of a part thereof (102) is complemented by a side (201) of the operating surface, particularly of the cavity or chamber for accommodating the patient, which side (201) is shaped complementarily to the recess (302) and complements at least partly, or fully, the supporting surface of the table (2) upon insertion into said recess (302).

34. A machine as claimed in one or more of the preceding claims 30 to 33, characterized in that it is a

Nuclear Magnetic Resonance Imaging machine having a C-shaped magnet, i.e. whose cavity may be accessed from three sides of its perimeter, and having two horizontal surfaces delimiting the cavity and covering the magnetic structure of the machine and in which the lower horizontal surface (201) is the part designed to complement the recess (302) of the table (2). 5

31. A table as claimed in one or more of the preceding claims, characterized in that magnet (1) having a smaller surface than the table (2) has at least a recess which has dimensions smaller than the table surface and such as to be bridged by the patient body without affecting the support thereof by the table. 10
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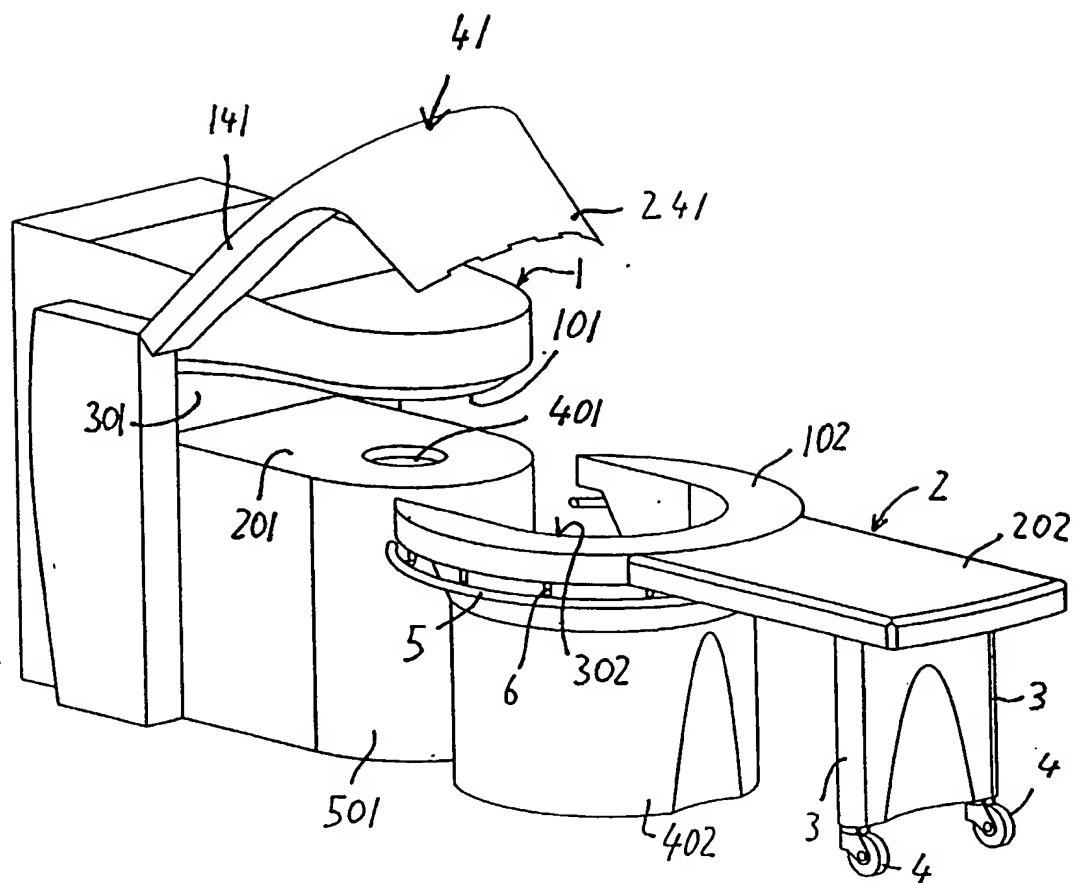


Fig. 1

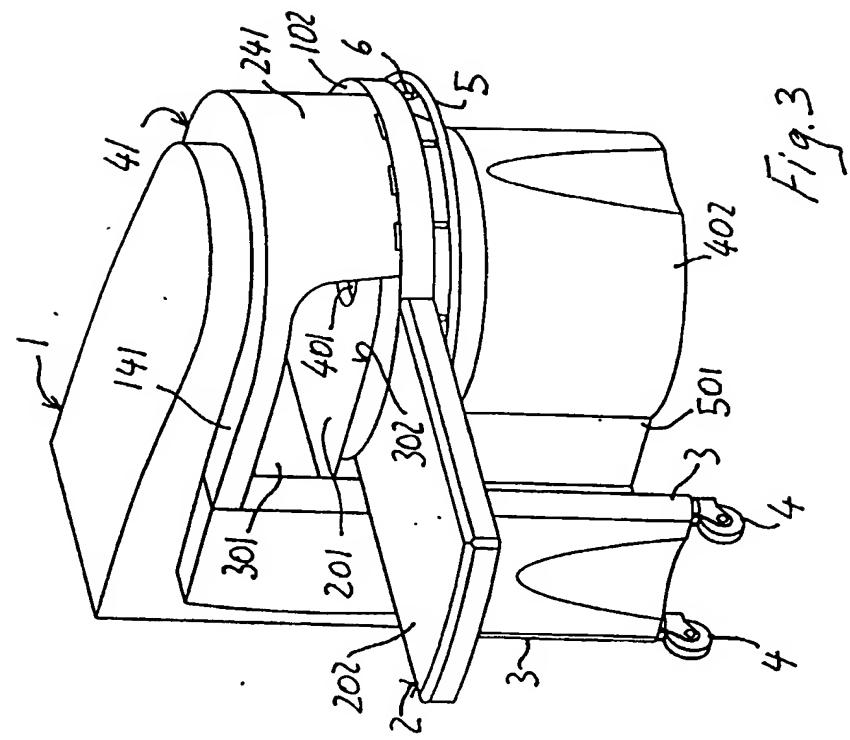


Fig. 3

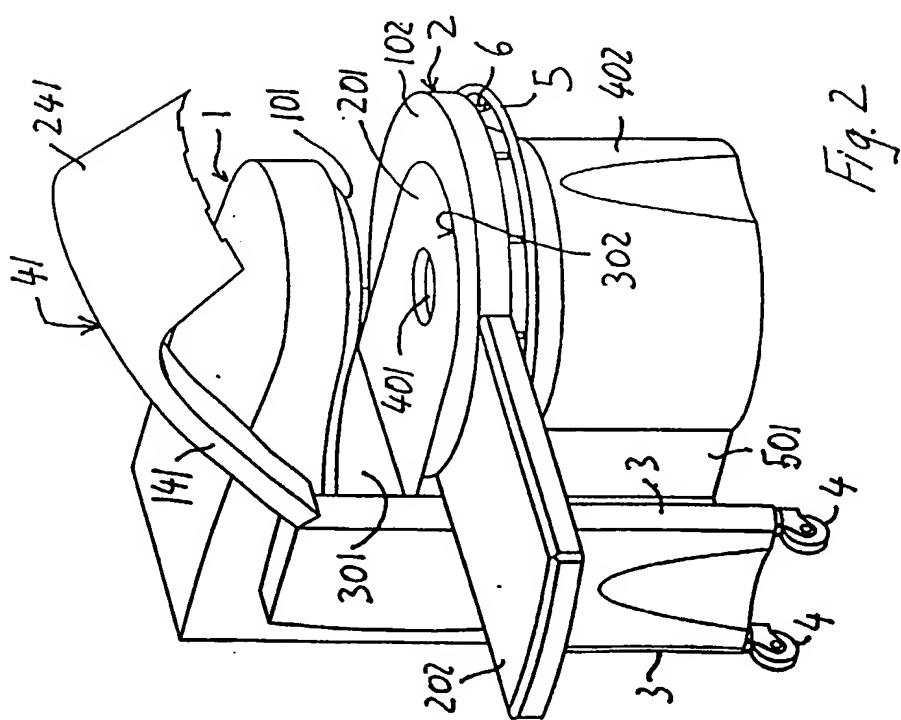
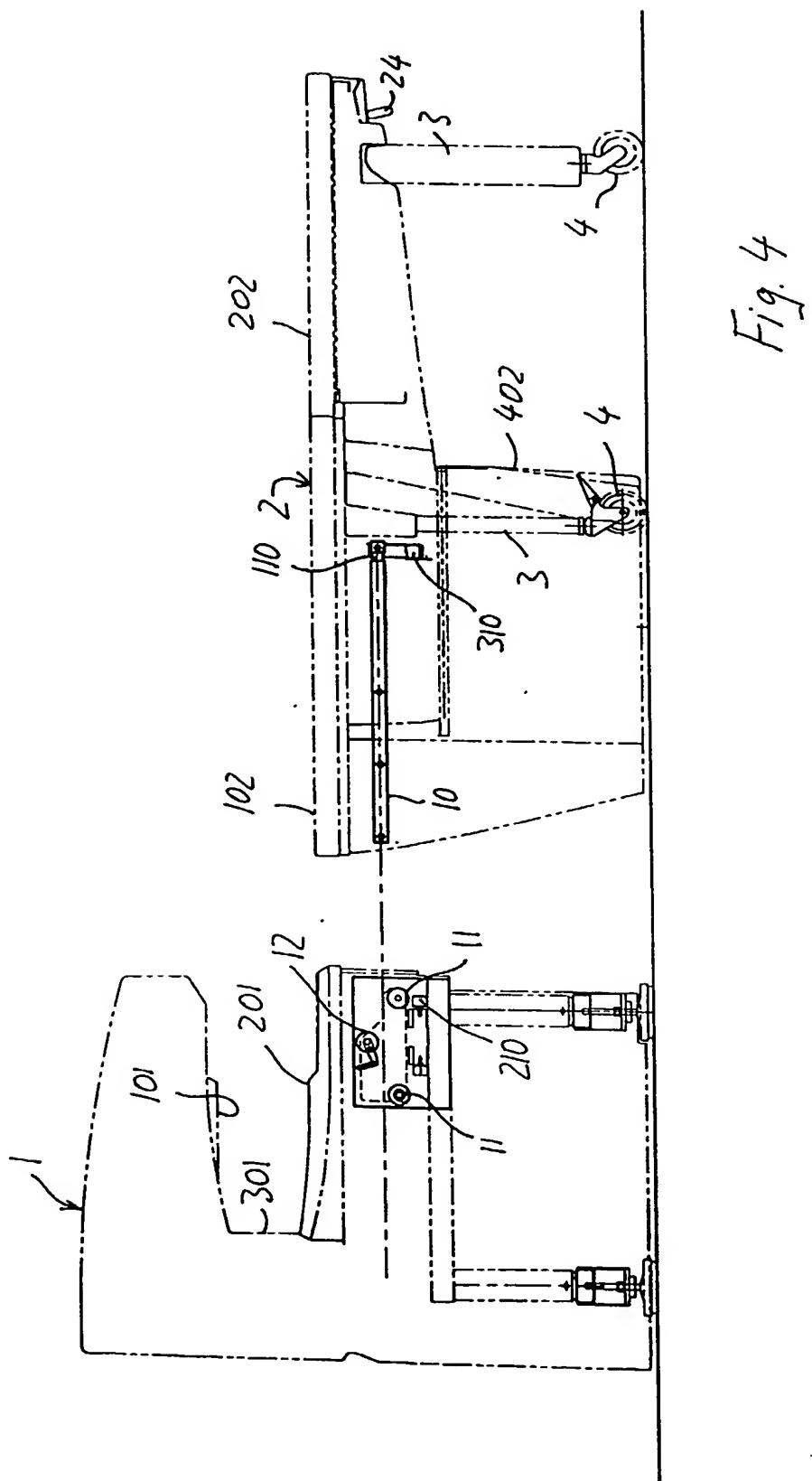
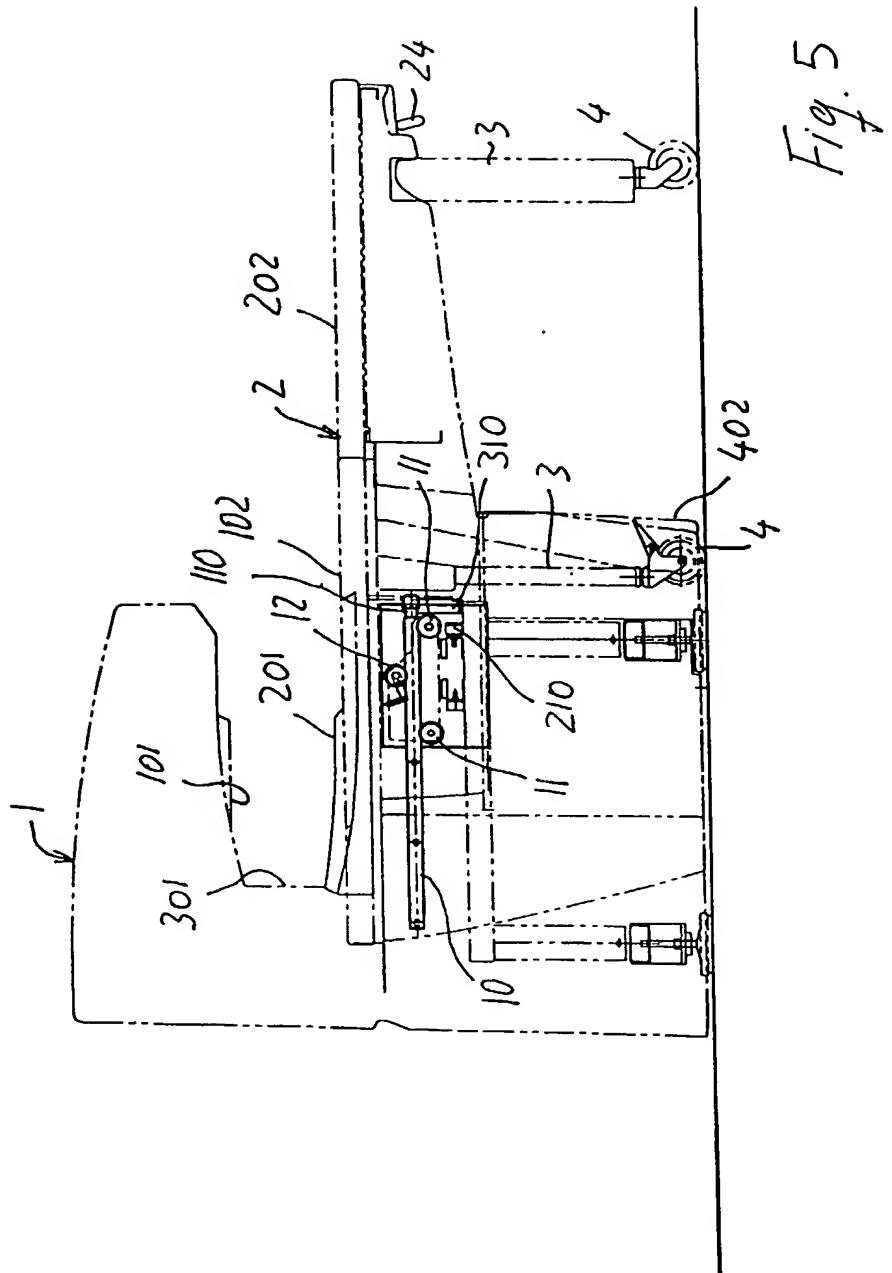
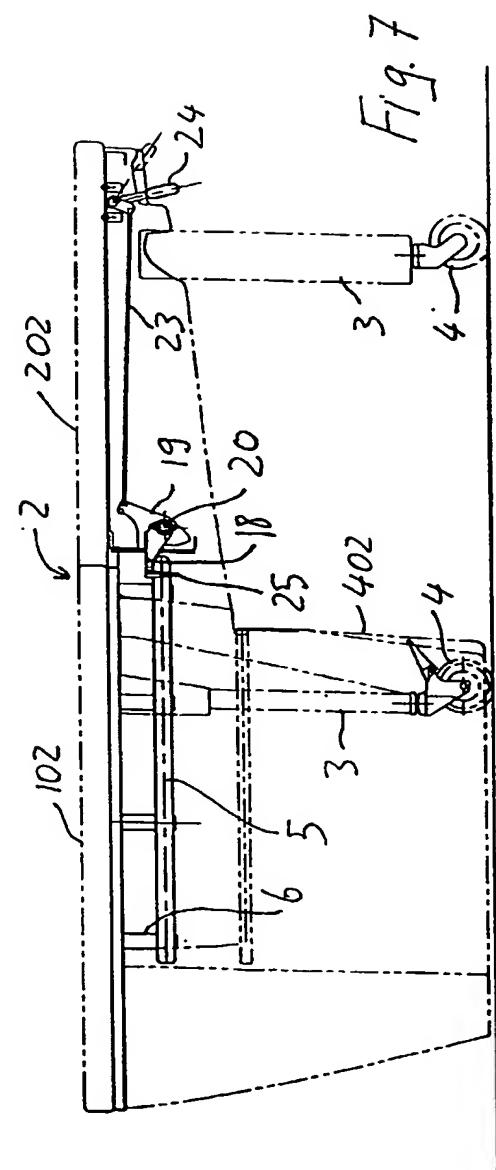
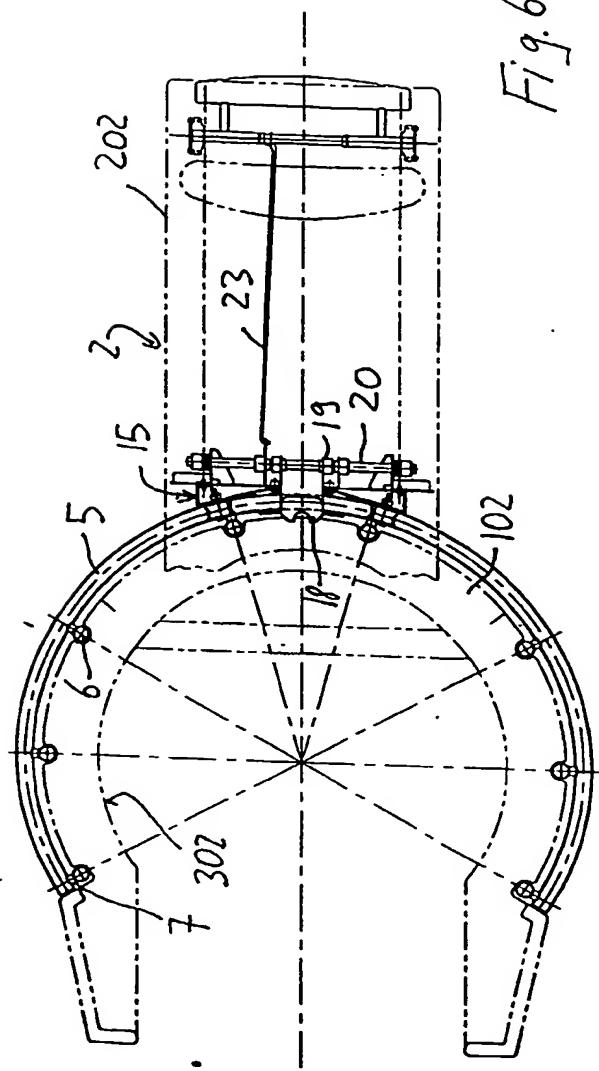
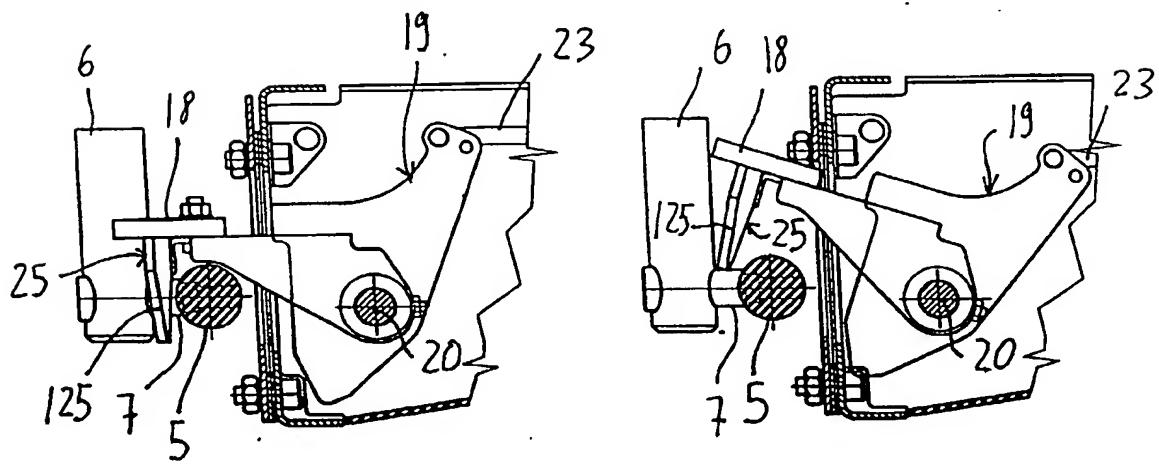
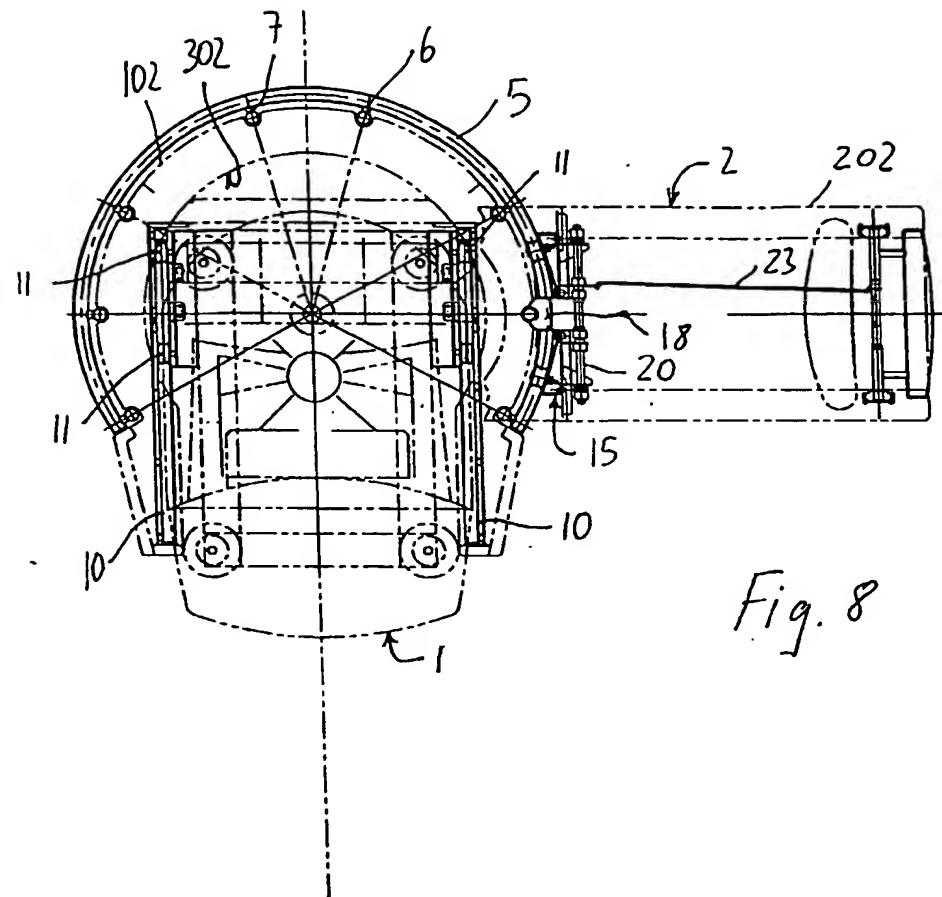


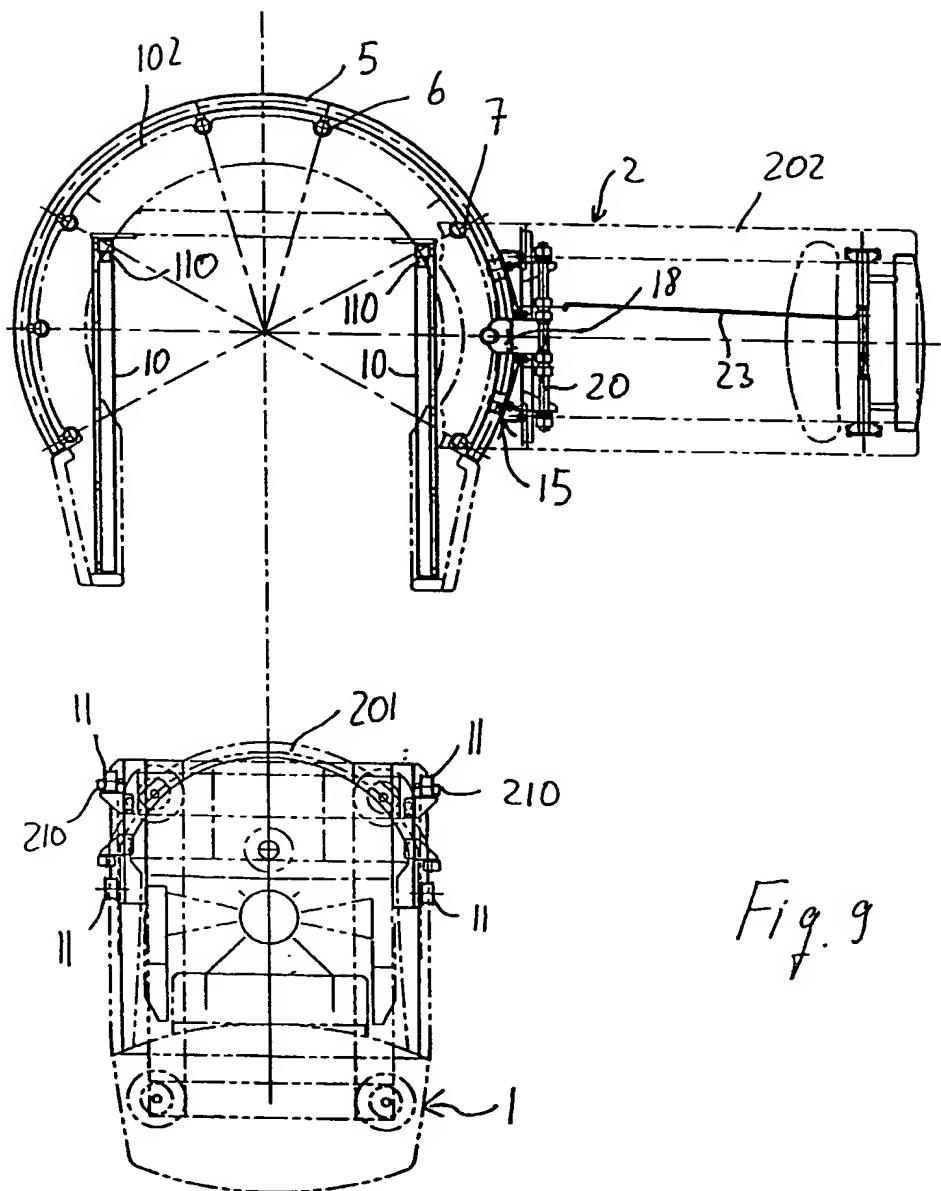
Fig. 2











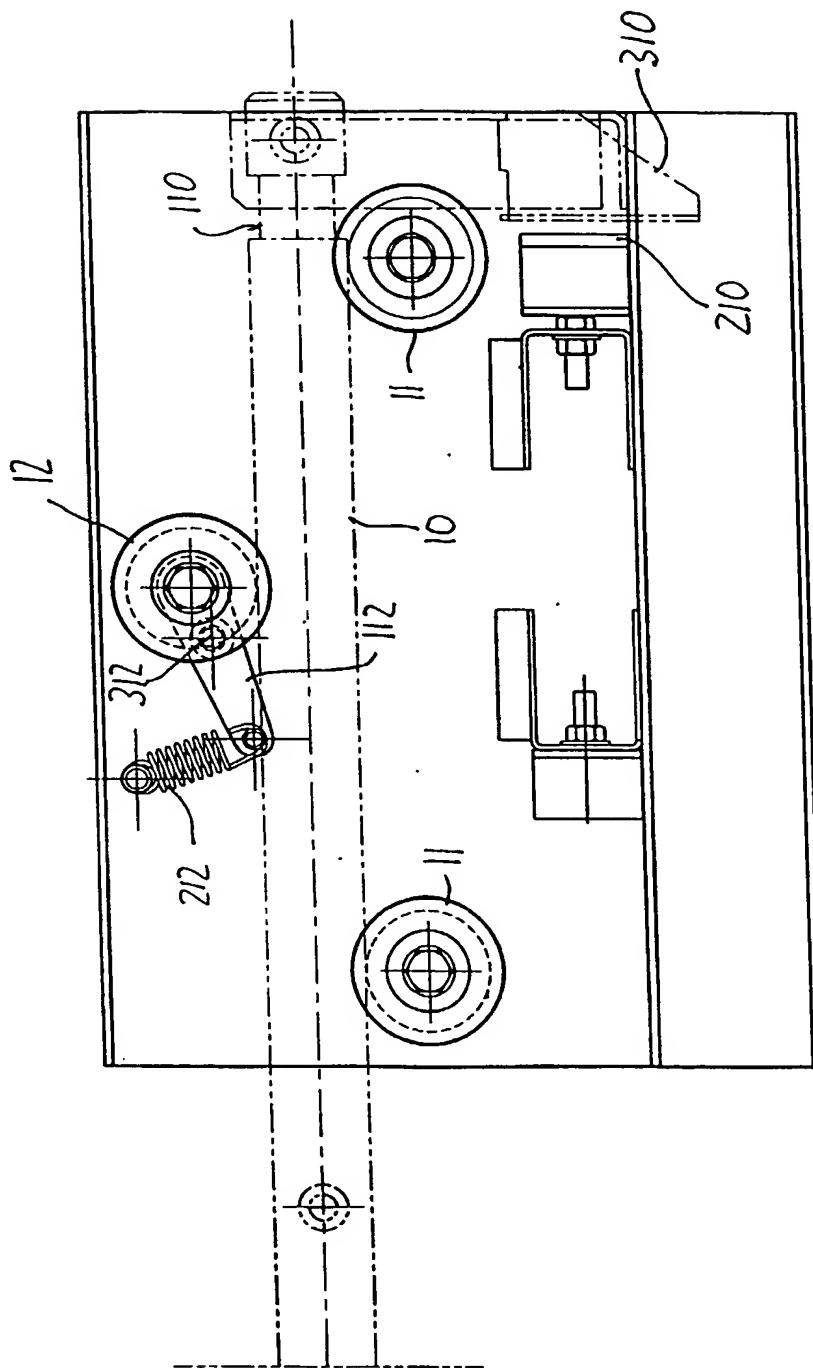


Fig. 10

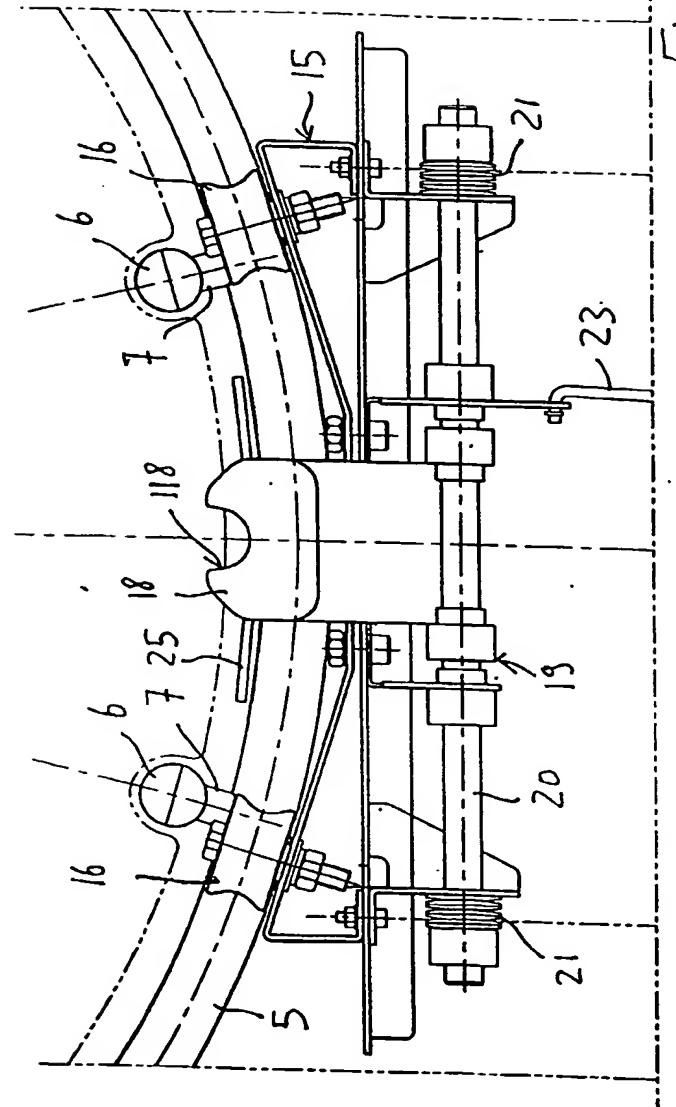


Fig. 11

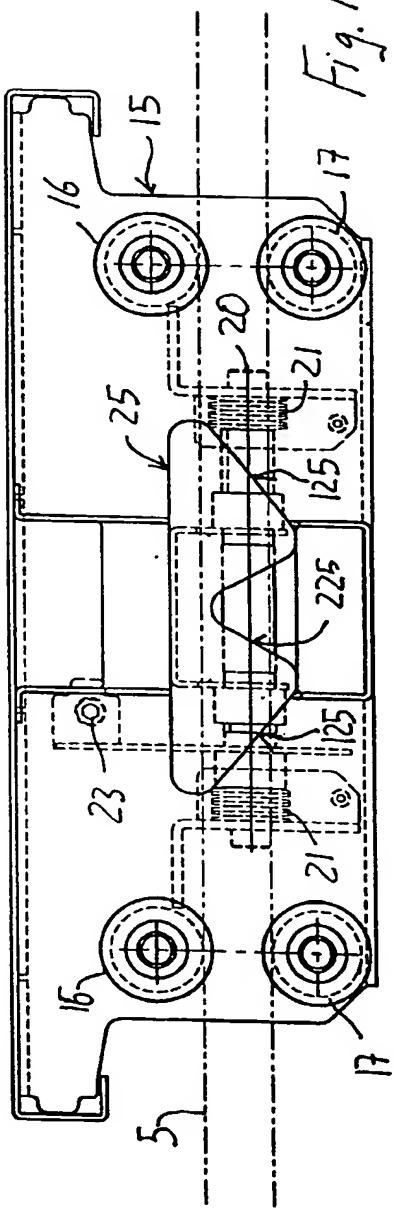


Fig. 12

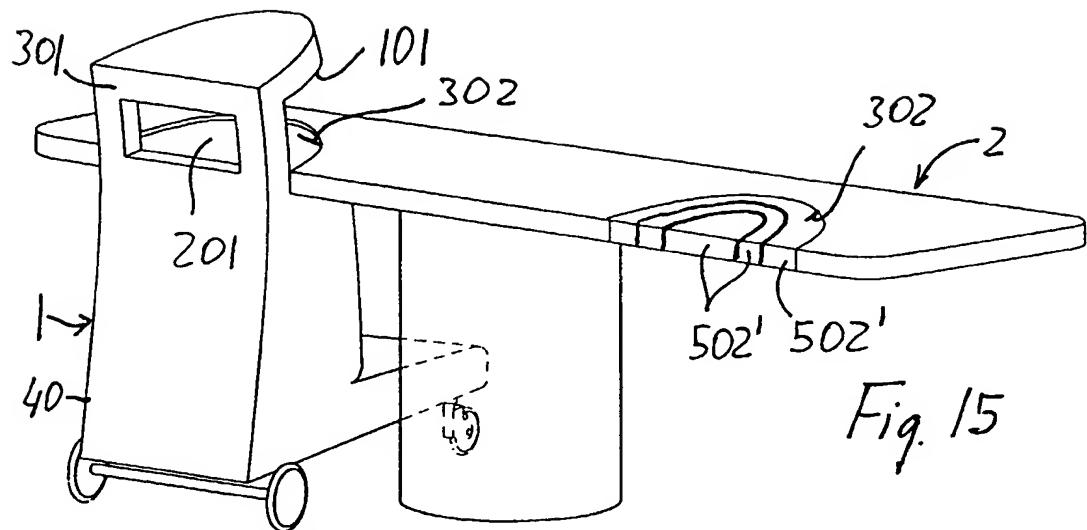


Fig. 15

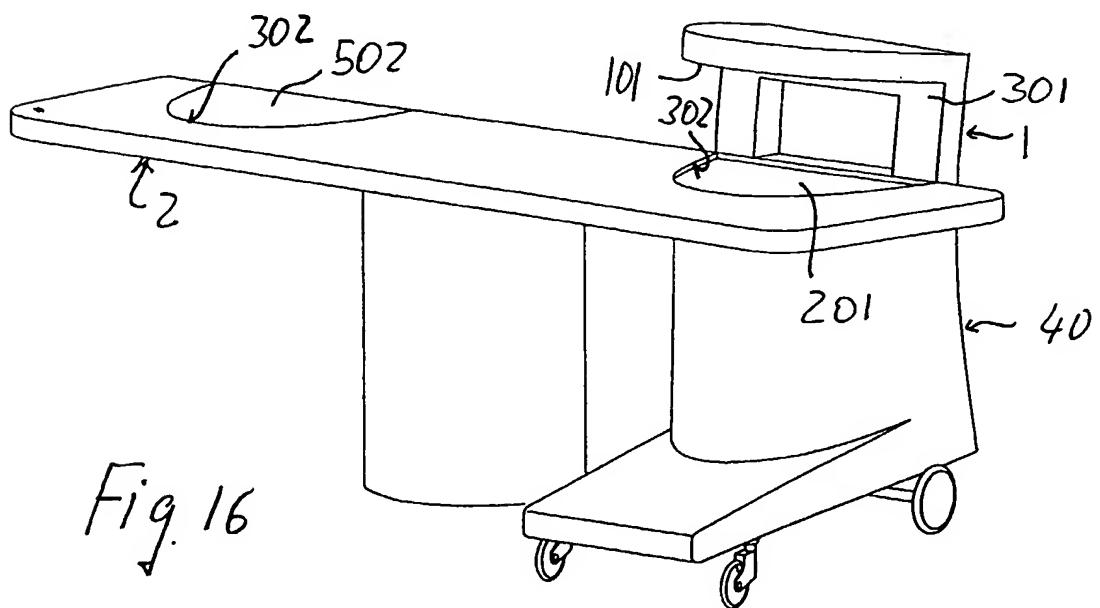


Fig. 16



European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 99 11 9481

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The present search report has been drawn up for all claims			
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THE HAGUE		23 March 2000	Rieb, K.D.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : Intermediate document			
T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons			
A : member of the same patent family, corresponding document			

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EP 99 11 9481

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